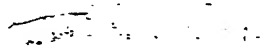


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DETAILED DESCRIPTION OF AN EXEMPLARY EMBODIMENT

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The present invention computes a result quickly, uses less computing resources and thus provides more useful and accurate initial estimates for the LM fitting parameters. The initial estimates provided by the present invention are robust, they do not require iteration, and they are quickly computed. The present invention uses chemometrics to obtain the initial estimates of fitting parameters. These chemometric estimations can then be used directly as estimates of a fluid parameter value or property or provided to the LM algorithm. The chemometric estimations provided to the LM algorithm provide a high probability of allowing the LM algorithm to converge quickly to the correct global minimum for the fluid parameter value estimation.

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Figure 4 is a schematic diagram of an exemplary embodiment of the present invention as deployed from a wireline downhole environment showing a cross section of a wireline formation tester tool. As shown in Figure 4, the tool 416 is deployed in a borehole 420 filled with borehole fluid. The tool 416 is positioned in the borehole by backup arms 416 417. A packer with a snorkel 418 contacts the borehole wall for extracting formation fluid from the formation 414. Tool 416 contains mechanical resonator assembly 410 disposed in flow line 426. The mechanical resonator 411 or oscillator, shown in Figure 5 as a tuning fork is excited by an electric current applied to its electrodes (not shown). The resonator response is monitored to determine density.